CLAIMS

What is claimed is:

1.   An optical switch comprising:

a triple fiber collimator for receiving an optical signal from a first fiber and outputting the optical signal to a second fiber or a third fiber;

a beam deflector having a first portion and a second portion; and

a reflector, the beam deflector residing between the reflector and the triple fiber collimator;

wherein the optical signal travels through the first portion of the beam deflector, is reflected by the reflector and is output over the second fiber when the beam deflector is in a first position;

and wherein the optical signal travels through the second portion of the beam deflector, is reflected by the reflector and is output over the third fiber when the beam deflector is in a second position.

2.   The optical switch of claim 1 wherein the reflector is a mirror having a high reflective coating.

3.   The optical switch of claim 1 wherein the first portion of the beam deflector includes a first side and a second side parallel to the first side, the optical signal traveling through the first side and the second side when the beam deflector is in the first position.

4. The optical switch of claim 3 wherein the second portion of the beam deflector includes a third side and a fourth side, the third side is at a first angle from the fourth side, the optical signal traveling through the third side and the fourth side when the beam deflector is in the second position, optical signal having a beam separation angle between a beam incident upon the reflector and a beam reflected by the reflector.

5. The optical switch of claim 4 wherein the beam deflector has an index of refraction (n) and wherein the beam separation angle, (β) and the first angle (α) obey the relationship:

$$\beta = \sin^{-1}(n \cdot \sin\{\alpha - (1/n)\sin^{-1}[\sin(2\alpha - \sin^{-1}(n \cdot \sin\alpha))]\}).$$

6. The optical switch of claim 1 wherein the triple fiber collimator has a crossing distance, the crossing distance being greater than a thickness of the beam deflector divided by an index of refraction of the beam deflector plus the distance between a back of the beam deflector and the mirror.

7. The optical switch of claim 1 wherein the triple fiber collimator is a C-lens or an aspherical lens triple fiber collimator.

8. A method for switching an optical signal, the method comprising the steps of:

(a) inputting the optical signal to a triple fiber collimator via a first fiber;

(b) providing the optical signal from the triple fiber collimator a beam deflector having a first portion and a second portion;

(c)   providing the optical signal from the beam deflector to a reflector used to provide a reflected optical signal, the optical signal and the reflected optical signal traveling through the first portion of the beam deflector and being output over the second fiber when the beam deflector is in a first position, the optical signal and the reflected optical signal traveling through the second portion of the beam deflector and being output over the third fiber when the beam deflector is in a second position.

9.   The method of claim 8 wherein the reflector is a mirror having a high reflective coating.

10.   The method of claim 8 wherein the first portion of the beam deflector includes a first side and a second side parallel to the first side, the optical signal traveling through the first side and the second side when the beam deflector is in the first position.

11.   The method of claim 10 wherein the second portion of the beam deflector includes a third side and a fourth side, the third side is at a first angle from the fourth side, the optical signal traveling through the third side and the fourth side when the beam deflector is in the second position, optical signal having a beam separation angle between a beam incident upon the reflector and a beam reflected by the reflector.

12.   The method of claim 11 wherein the beam deflector has an index of refraction (n) and wherein the beam separation angle, (β) and the first angle (α) obey the relationship:

$$\beta = \sin^{-1}(n \cdot \sin\{\alpha - (1/n)\sin^{-1}[\sin(2\alpha - \sin^{-1}(n \cdot \sin\alpha))]\}).$$

13. The method of claim 8 wherein the triple fiber collimator has a crossing distance, the crossing distance being greater than a thickness of the beam deflector divided by an index of refraction of the beam deflector plus the distance between a back of the beam deflector and the mirror.

14. The method of claim 8 wherein the triple fiber collimator is a C-lens or an aspherical lens triple fiber collimator.